MINIMIZING FIRE HAZARDS AND MAINTAINING THE ECOLOGICAL INTEGRITY OF TRAINING LANDS THROUGH SUPPRESSION OF CHEATGRASS

Brad Jesson and Dr. Val Jo Anderson

U.S. Army Dugway Proving Ground

Presentation Outline

1. Background
2. Cheatgrass
   - Description & Distribution
3. Ecological problems
   - Dominance Strategies
   - Fire Ecology
4. Impacts on Military Training
5. Study Description and Results

Study Location

U.S. Army Dugway Proving Ground, Tooele Co., Utah

U.S. ARMY DUGWAY PROVING GROUND

FIRES OCCURING BETWEEN 1995 & 2000 TRAINING AND IMPACT AREAS ANNUAL EXOTIC WEEDS

Legend:

- Fires 2000 (496 Acres)
- Fires 1998 (25,734 Acres)
- Fires 1996 (17,244 Acres)
- Fires 1995 (7,331 Acres)
- Fires 1994 (11,740 Acres)

62,545 Total Acres Burned

- Cheatgrass
- Training Areas
- Impact Areas
- DPG Boundary

There were no fires in 1997 or 1999.

N
W E
S

UTM Projection
NAD 27 Zone 12
Clarke 1866 Elipsoid

5 0 5 10 15 20 Miles

Map Produced by Jason Raff ORISE Participant CSTE-DTC-DP-EP 8/2000

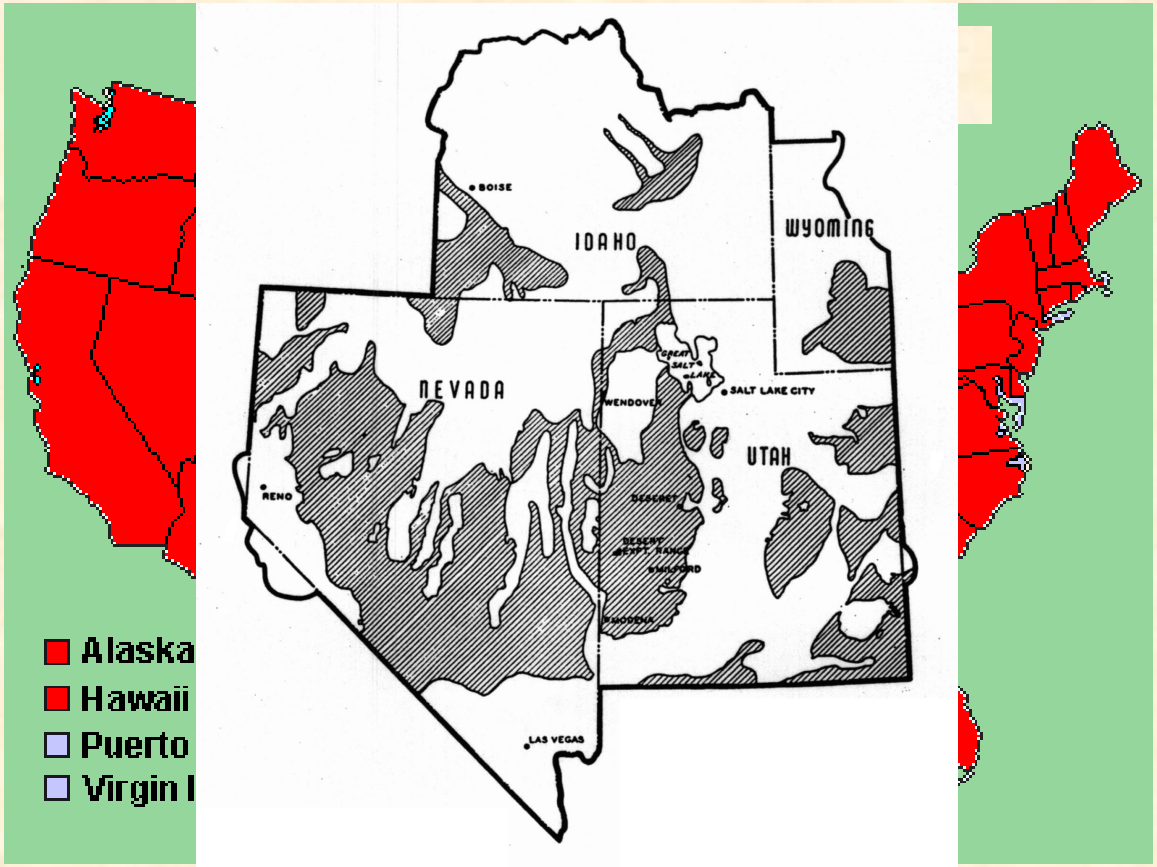
~Cheatgrass~

Description
& Distribution

Cheatgrass: Descriptio

- Winter annual grass
- Introduced from Europe
- Height: 4” - 30”
- Seeds: 1/4” - 3/8”
- Awn: 1/4” - 1/2”

Distribution of Cheatgrass



Elevation Range: 2000’ to 9000’

Geographic Range: All 50 states + Canada

- Most Common in Western U.S.
- Dominates Great Basin and Columbia Basin

~Cheatgrass~

Ecological Problems

Why Is Cheatgrass Problematic?

- Displaces native plants
- Prevents the establishment of desirable perennial species
- Alters natural fire frequency

Cheatgrass

Strategy for Dominance

+ Germinates and establishes quickly

+ Germinates under conditions where other plants cannot

+ Produces large #'s of viable seed (> 300 seeds per plant)

+ HIGHLY FLAMMABLE!

= Self perpetuating cycle of environmental degradation which results in a decrease in plant diversity and ecosystem productivity

~Cheatgrass~

Fire Ecology

Cheatgrass Flammability

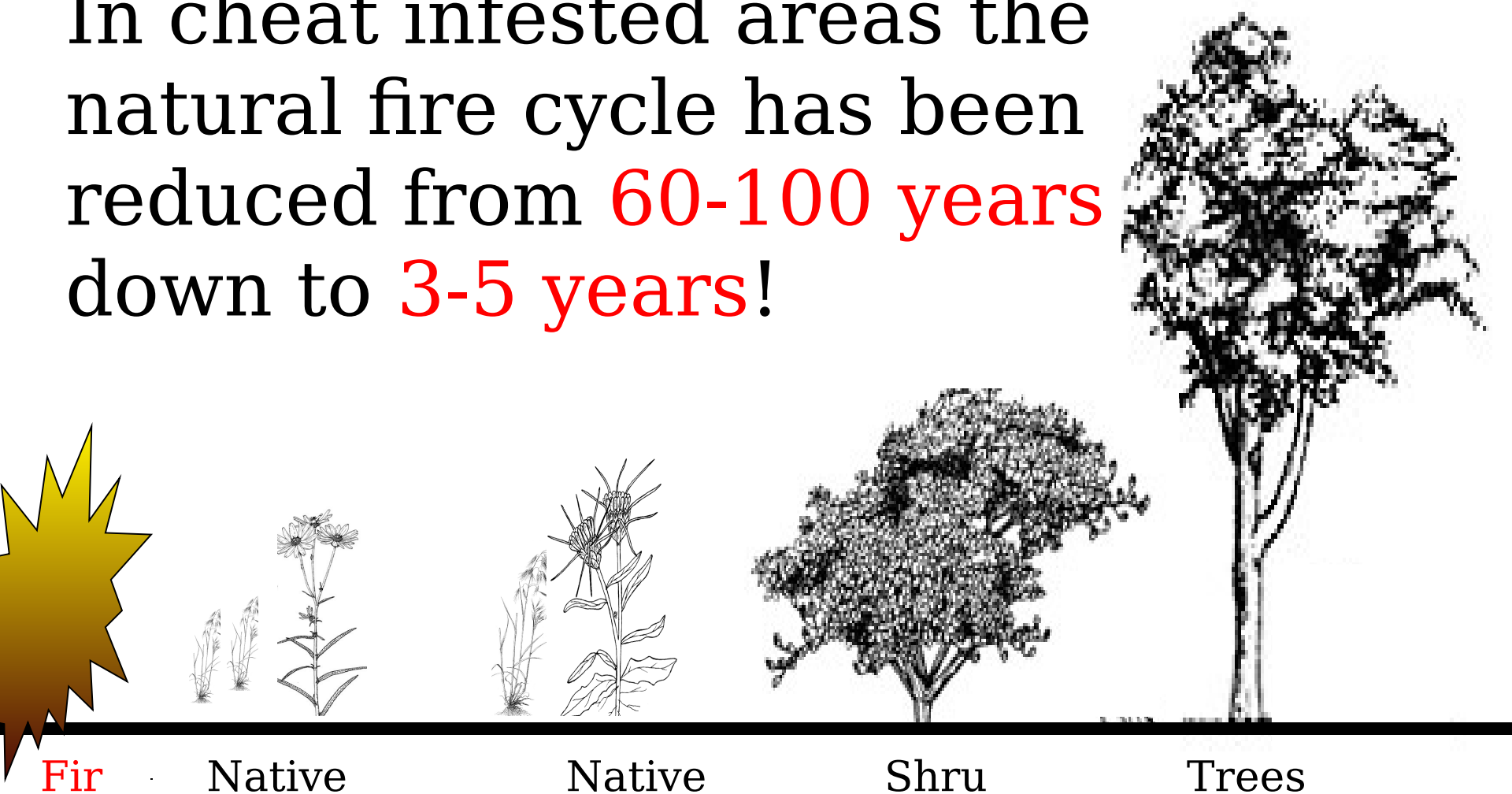
- A fine fuel that dries early in the season
- Cheatgrass increases the chances of fire **10 to 500 times!**

Cheatgrass Flammability

-Provides a continuous fuel source in plant interspaces

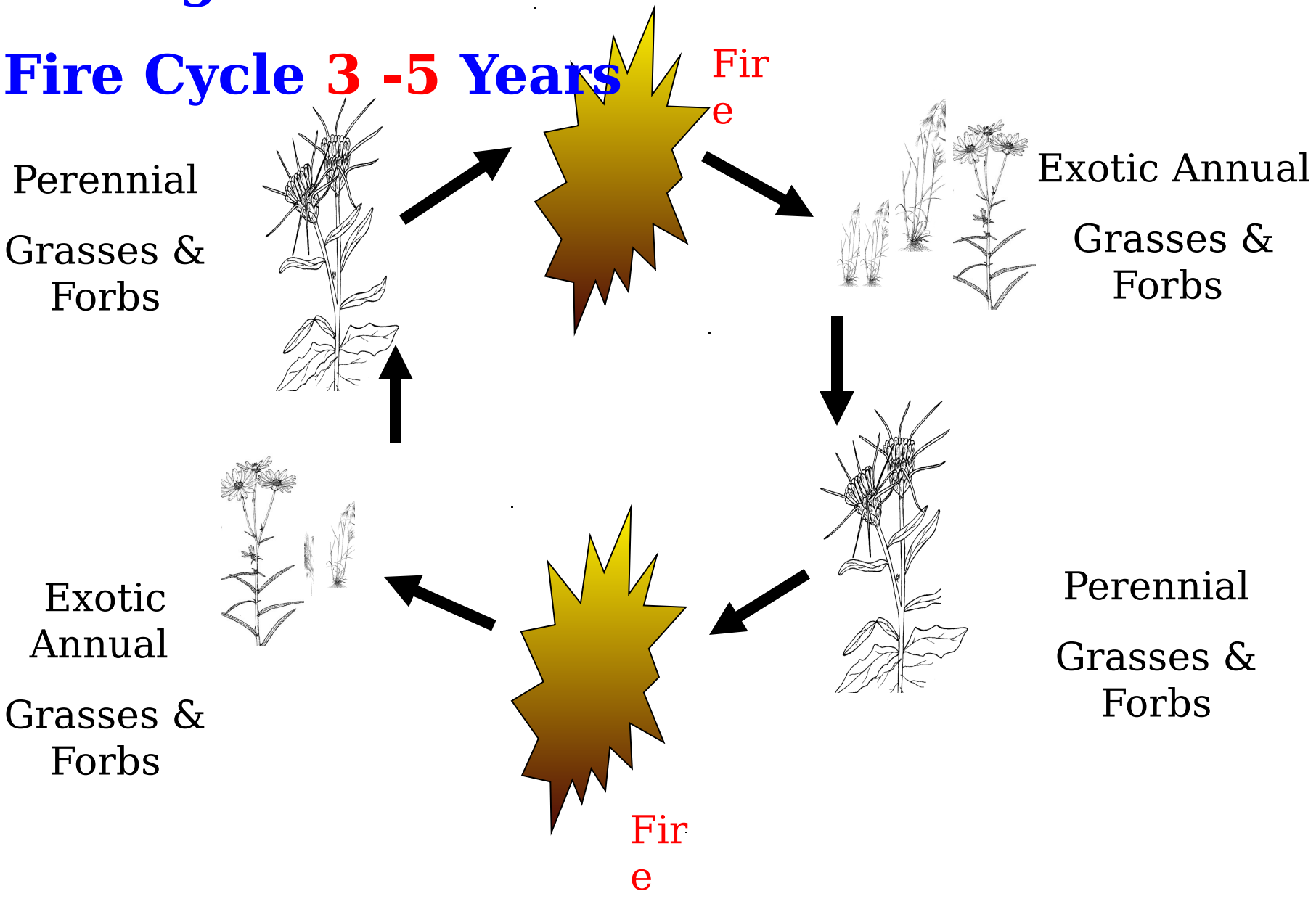
11:40:12 AM

In cheat infested areas the natural fire cycle has been reduced from 60-100 years down to 3-5 years!



Plant Succession: With Cheatgrass

Fire Cycle 3 -5 Years



Exotic annual grass and forb dominated lands

~Cheatgrass~

Impact on Military Training

Impacts of Cheatgrass on Military Training

Cheatgrass results in:

1. Increased fire hazards

   -loss of training time = loss of $$$

   -conceals UXOs

   -heat from fire causes UXOs to explode potentially endangering lives

June 18, 2001--Deseret News

Bluffdale brush fire sets off mortar shells

"A brush fire rages in Bluffdale Sunday as vehicles race by before the flames reach the highway. Salt Lake and Utah County crews spent more than seven hours subduing the 700-acre fire that threatened Army structures near Camp Williams. The blaze touched off mortar shells left in fields where the base tests weapons, hampering efforts to contain the fire."

Fact: Sparks from pyrotechnic munitions disposal landed in cheatgrass igniting the fire

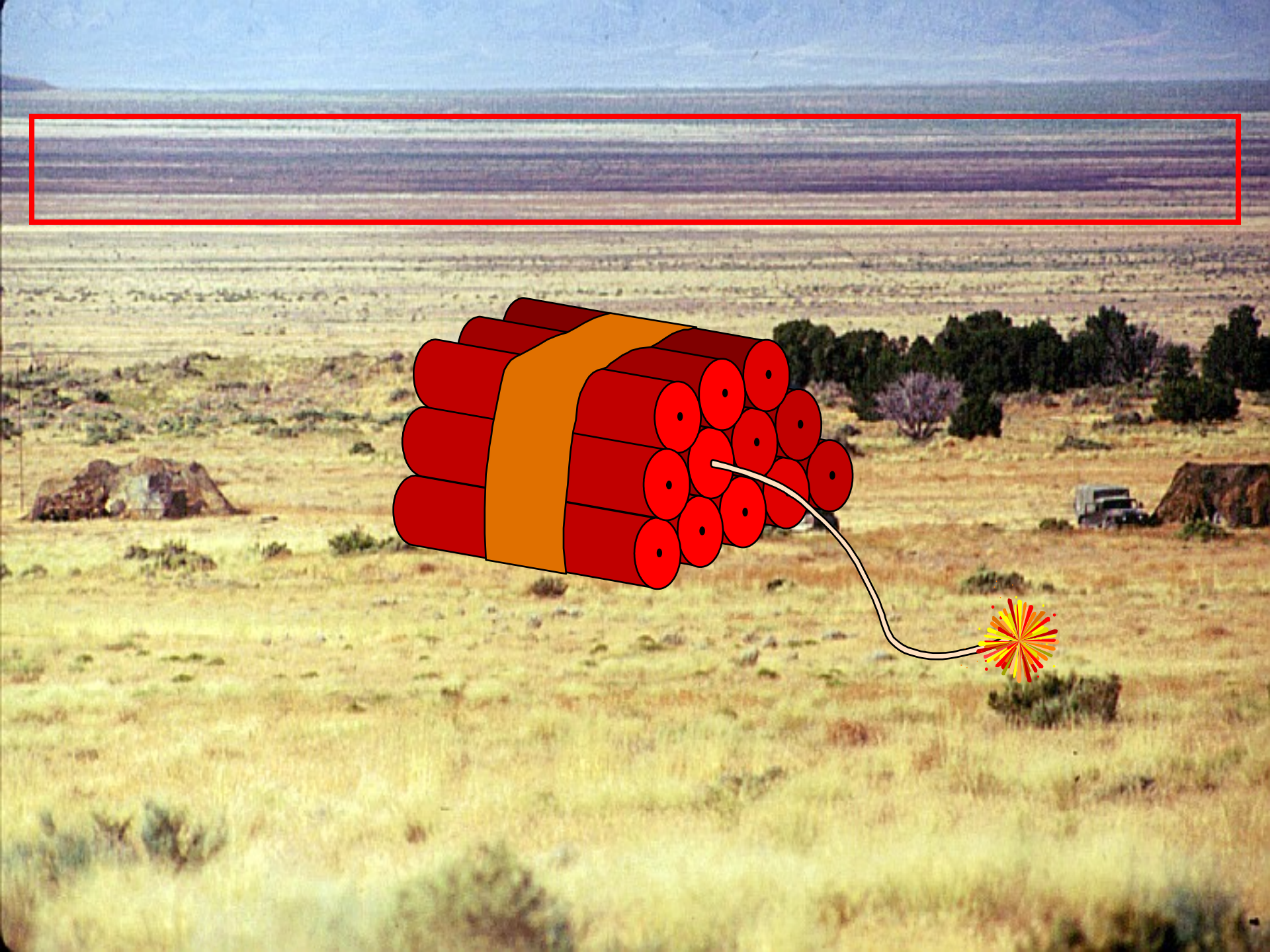
Fact: The fire burned 5 acres in less than 10 minutes endangering the lives of the soldiers on duty

Impacts of Cheatgrass on Military Training

Cheatgrass results in:

1. Increased fire hazards
   - -loss of training time = loss of $$$
   - -conceals UXOs
   - -heat from fire causes UXOs to explode potentially endangering lives

2. Loss of cover for concealment

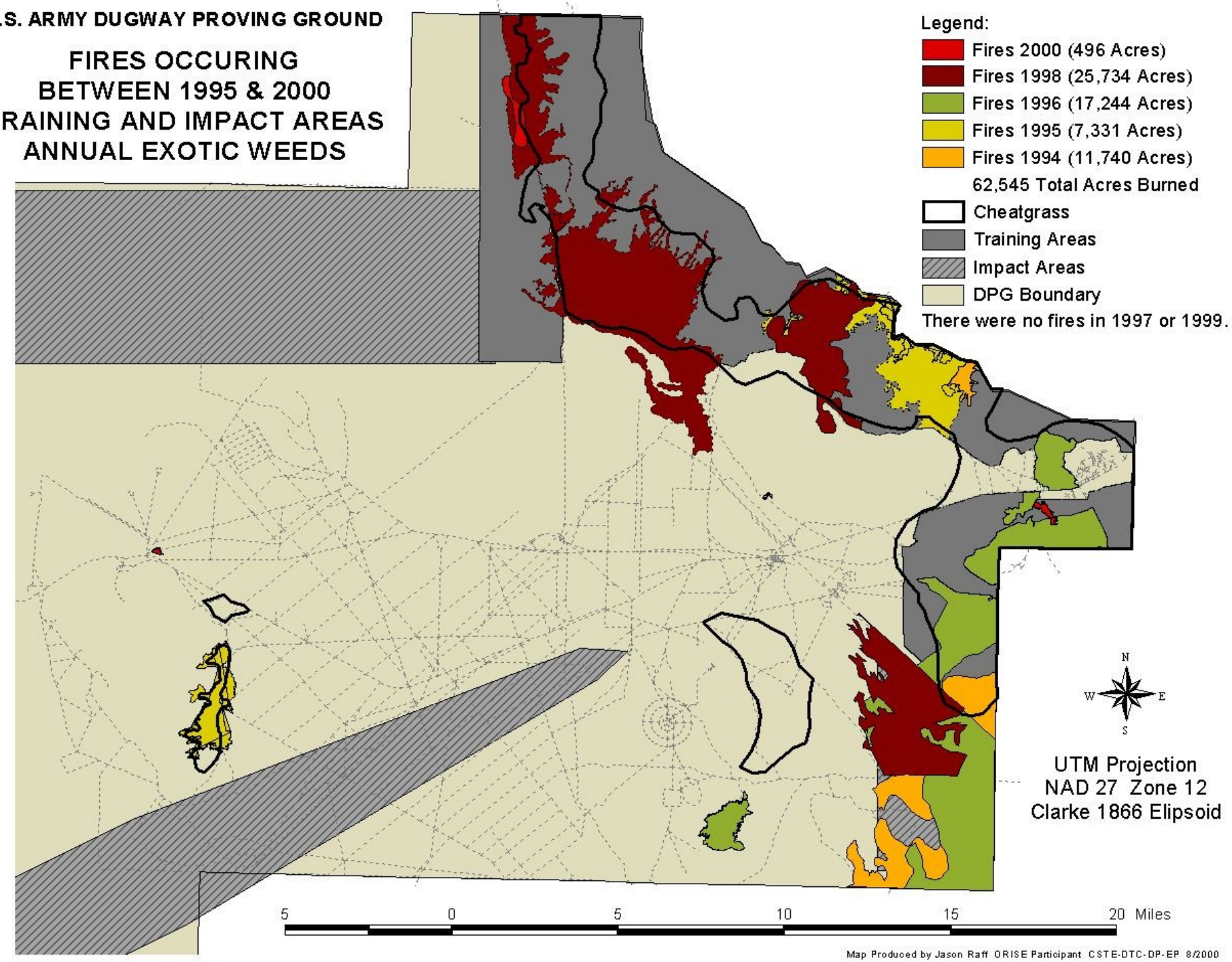


~Cheatgrass~

Study Description & Results

U.S. ARMY DUGWAY PROVING GROUND

FIRES OCCURING BETWEEN 1995 & 2000 TRAINING AND IMPACT AREAS ANNUAL EXOTIC WEEDS



Map Produced by Jason Raff ORISE Participant CSTE-DTC-DP-EP 8/2000

Objectives

1. To determine the rate of cheatgrass invasion into previously unburned native shrub communities following fire.

2. To determine the extent to which drill-seeding perennial species would slow the encroachment of cheatgrass.

Hypothesis

-- Drill-seeding perennial species will slow the encroachment of cheatgrass.

Site Selection

2 burned shrub communities

Greasewood (*Sarcobatus vermiculatus*)

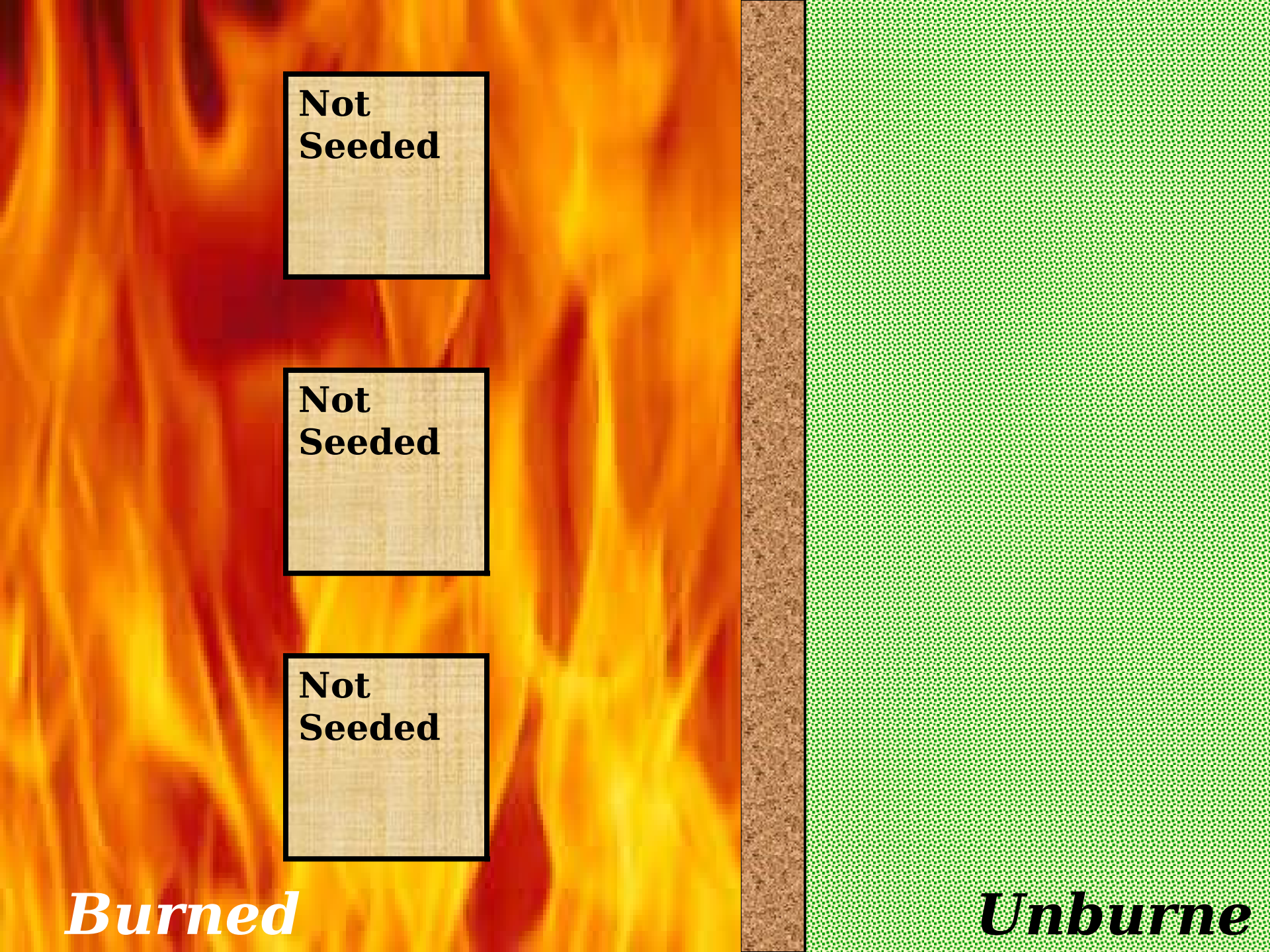
- 6-8” annual precipitation
- 4375’ elevation

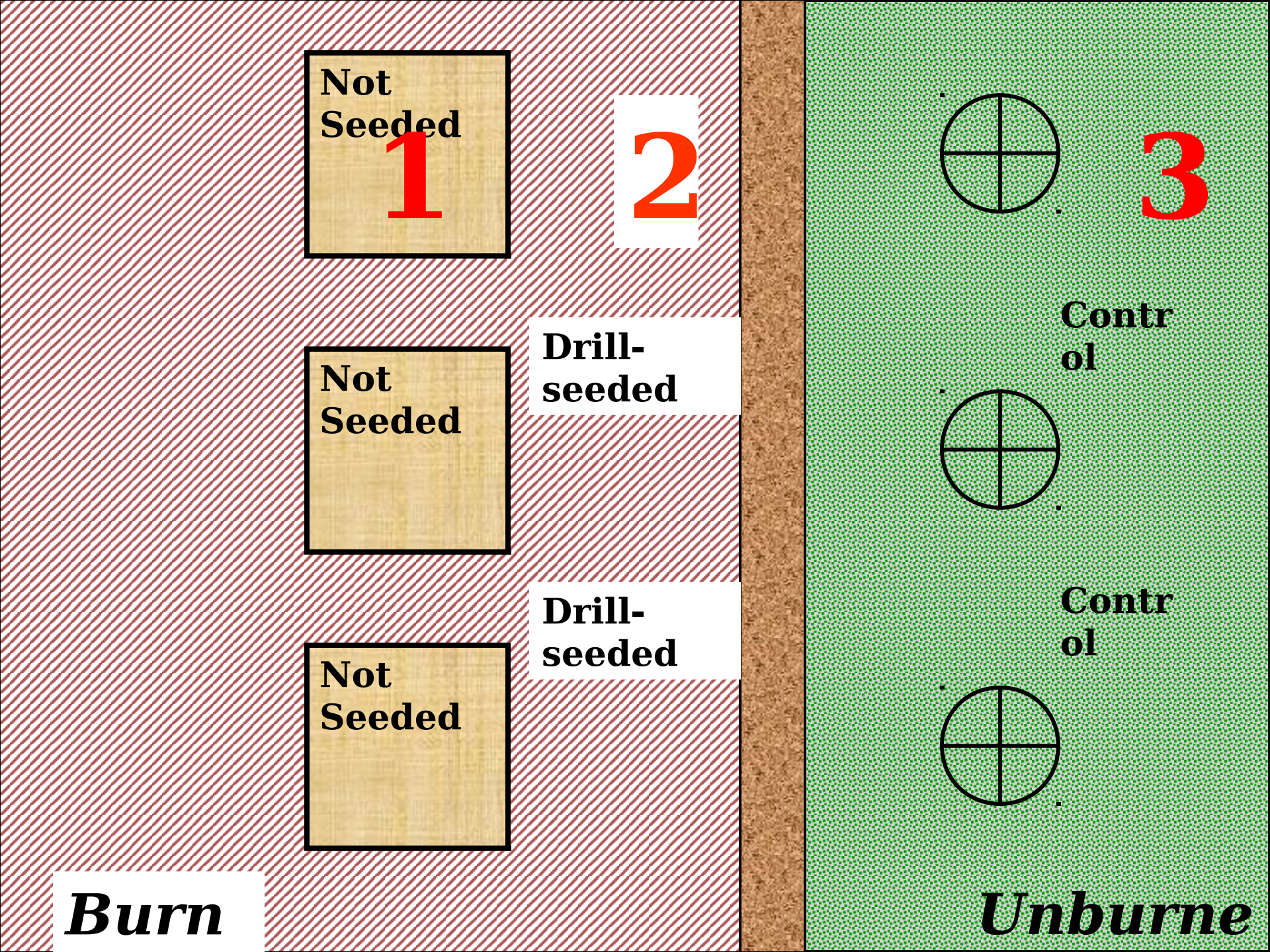
Black sagebrush/Shadscale (*Artemisia nova /Atriplex confertifolia*)

- 10-12” annual precipitation
- 4900-5040’ elevationHiko Peak very stony loam soils

Greasewood
Pre-Burn
Post-Burn

Black sagebrush
Pre-Burn
Post-
Burn


Not Seeded
Not Seeded
Not Seeded
Burned
Unburne


Not Seeded
1
2
3
Drill-seeded
Not Seeded
Contr ol
Drill-seeded
Not Seeded
Contr ol
Burn
Unburne

Seeding Methods

Drill-seeding with a rangeland drill
Perennial grass/forb/shrub seed mix
Rate: 13.5 lbs/acre
Greasewood - March 1999
Black sage - December 1998

Seed Mix

Greasewood and Blacksage Sites

-**Four wing saltbrush** (*Atriplex canescens* Nutt.)

-**Blue Flax** (*Linum lewisii* Pursh)

-**Crested Wheatgrass** (*Agropyron cristatum* L. Gaertner)

-**Indian Ricegrass** (*Oryzopsis hymenoides* R.& S.)

-**Thickspike Wheatgrass** *(Elymus lanceolatus* Scribn. & Sm., Gould)

-**Russian Wildrye** (*Elymus junceus* Fisch.)

Additional Species (In Blacksage Site Only)

-**Wyoming Big Sagebrush** (*Artemisia tridentata* var.*wyomingensis* Beetle & Young, Welsh)

-**Dryland Alfalfa** (*Medicago sativa* L.)

-**Yellow Sweet Clover** (*Melilotus officinalis* L. Pallas)

Data Collection

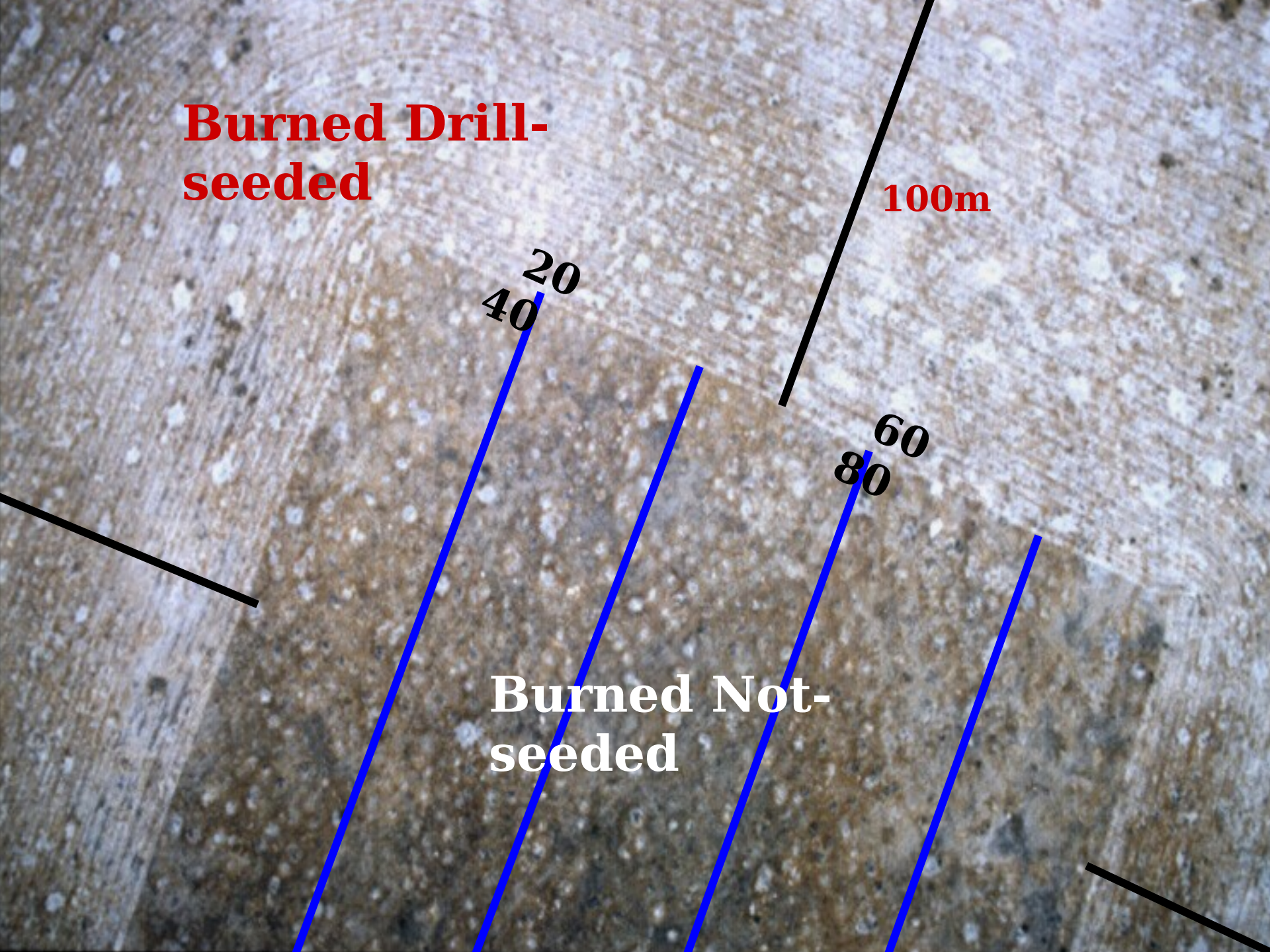
125cm x 25cm Rectangular PVC Q

-Density of seeded species

(individual seedlings counted and lumped into grass/forb/shrub category)

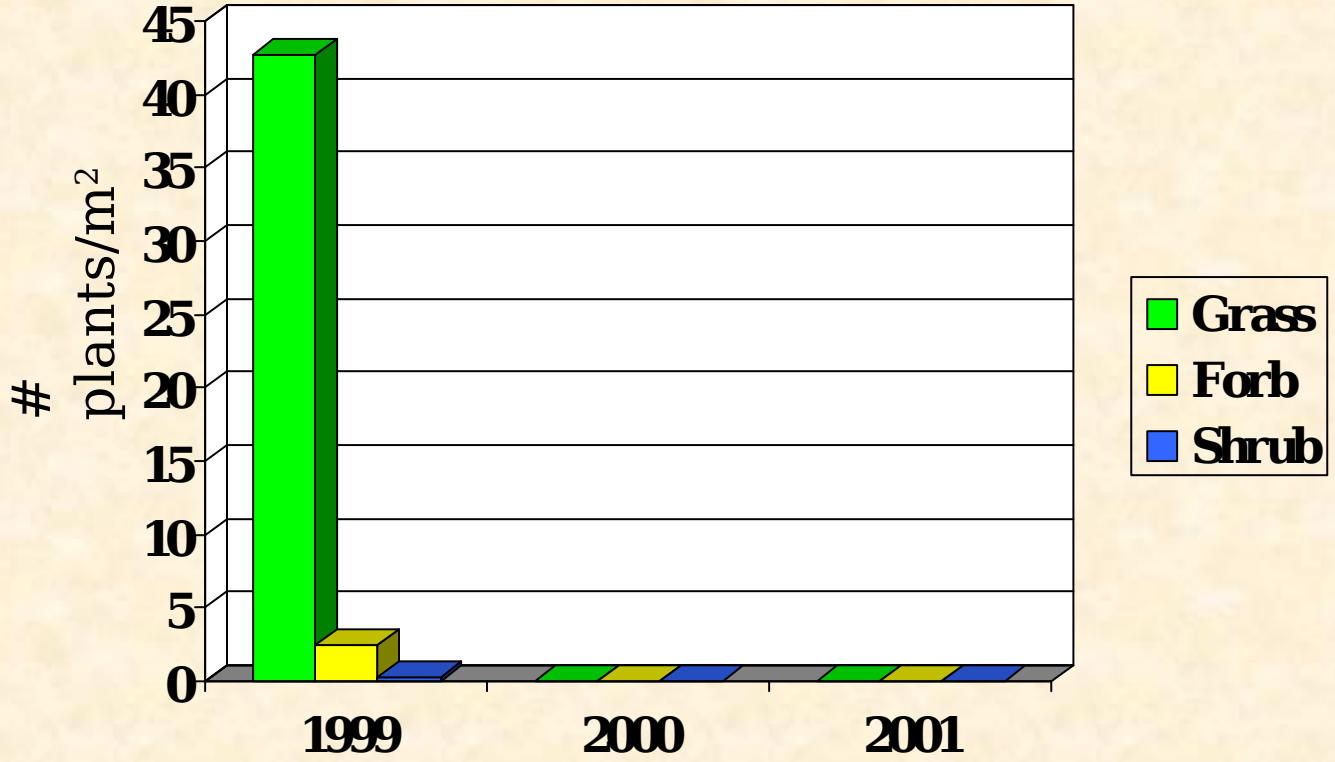
-Density of cheatgrass

(1 basal clump = 1 seedling)


Burned Drill-seeded
100m
20
40
60
80
Burned Not-seeded

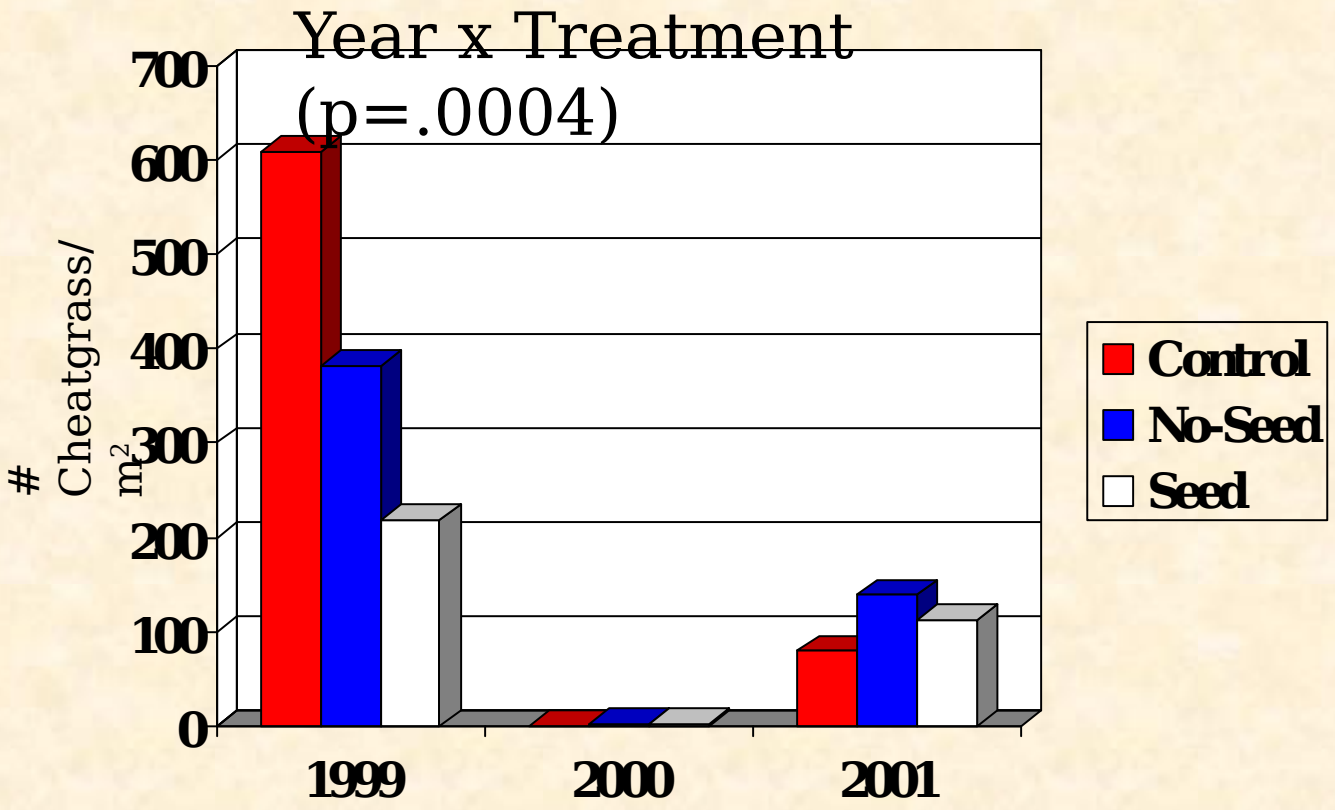
Seeded Species/m²

Year x Treatment



Greasewood Site

Cheatgrass Density/m²



Greasewood Site

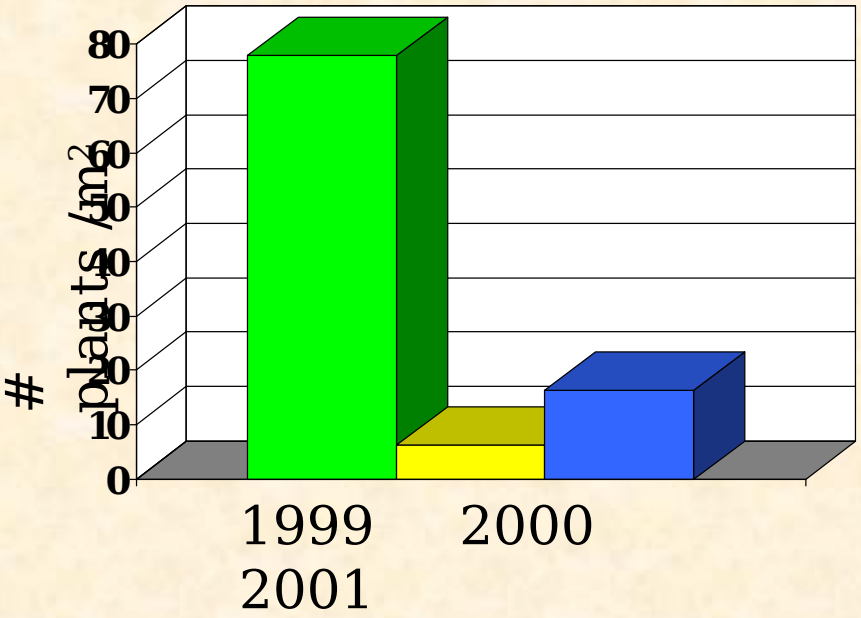
Burned Not-seeded

Burned Drill-seeded

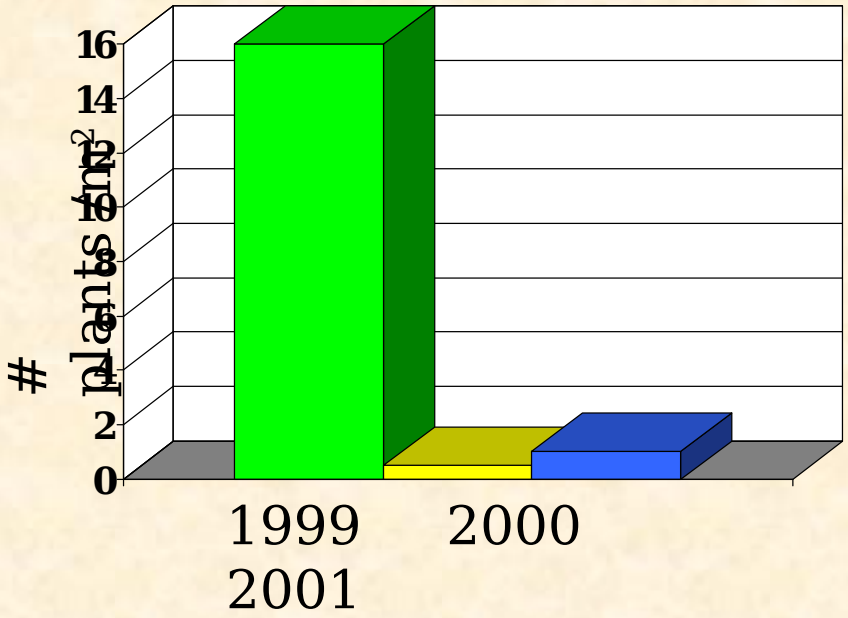
Greasewood Site

Seeded Species/m² (Year x Treatment)

Grasses

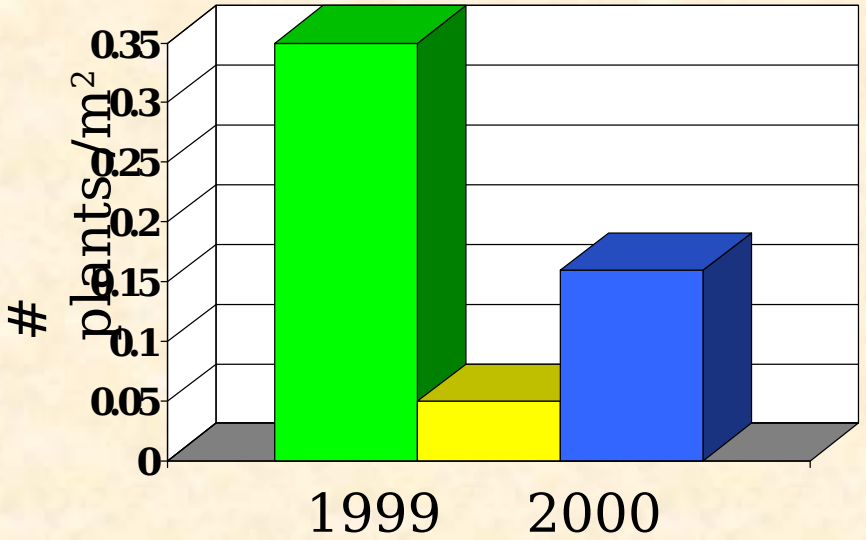


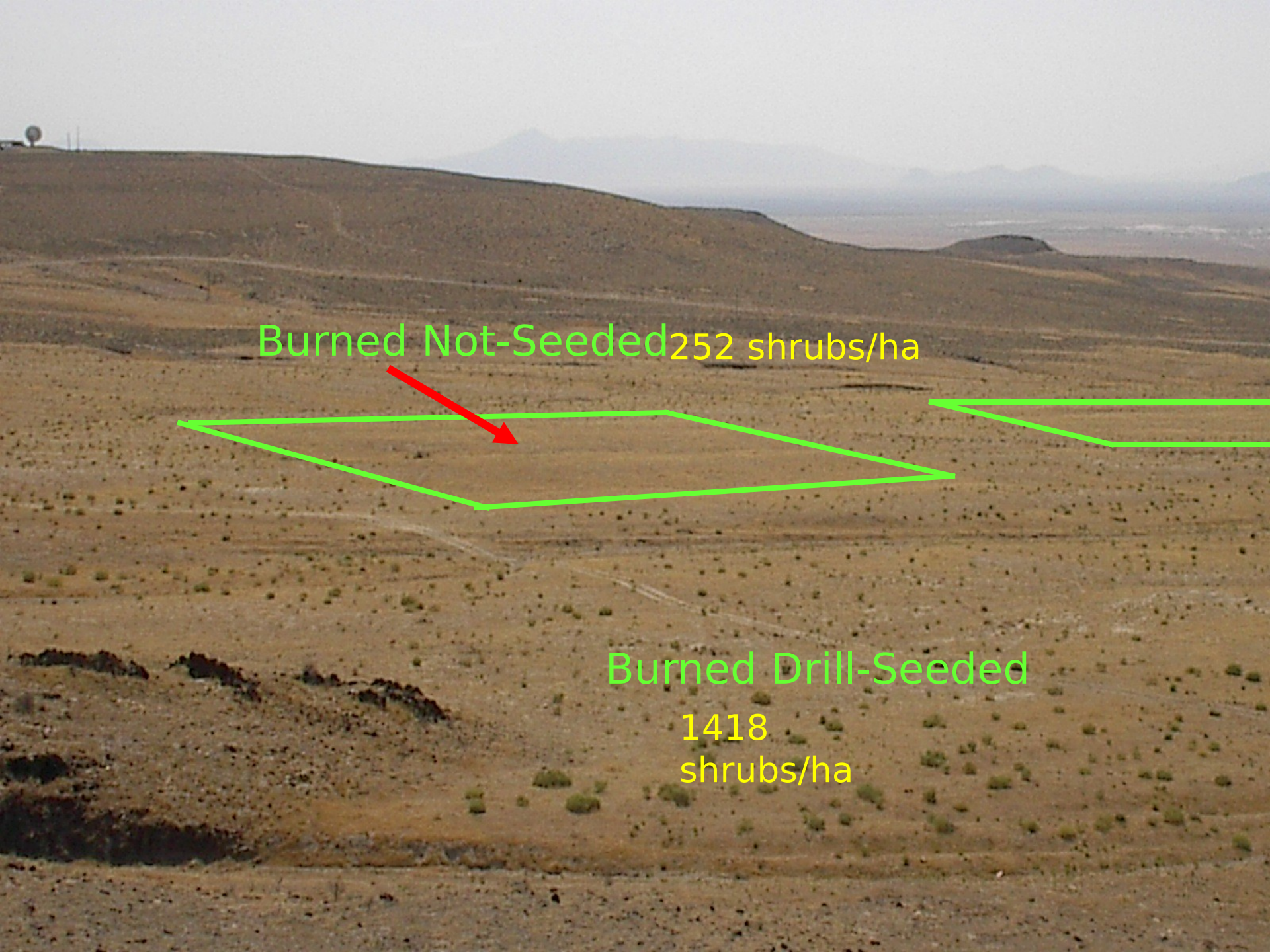
Forbs



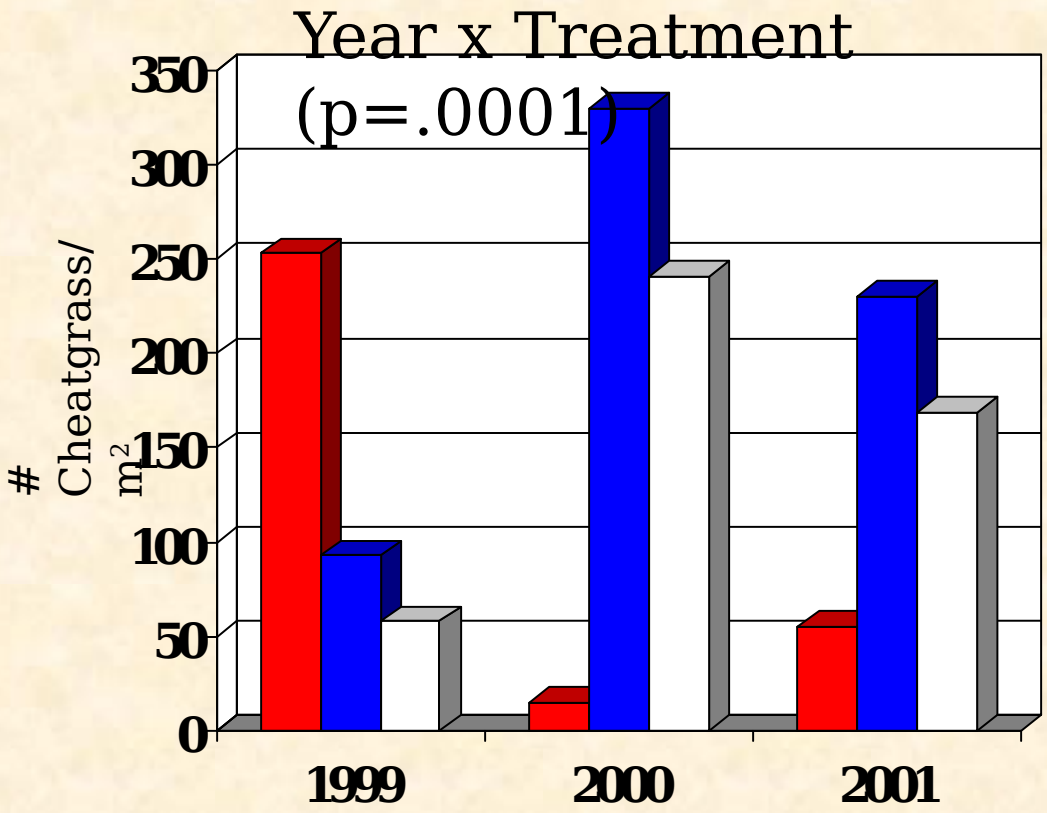
Black Sagebrush Site

Shrubs



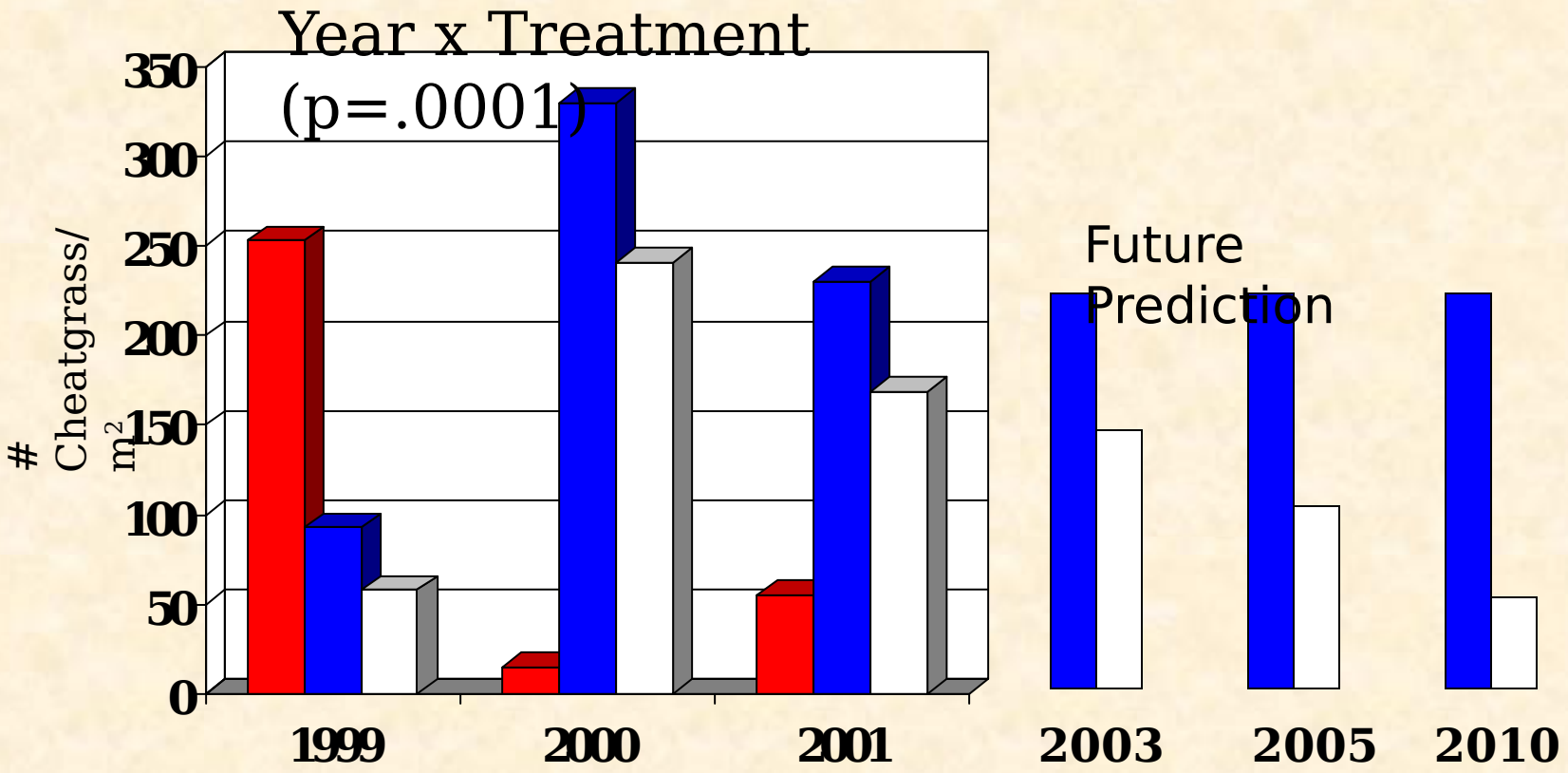

Burned Not-Seeded
252 shrubs/ha
Burned Drill-Seeded
1418
shrubs/ha

Cheatgrass Density/m^2



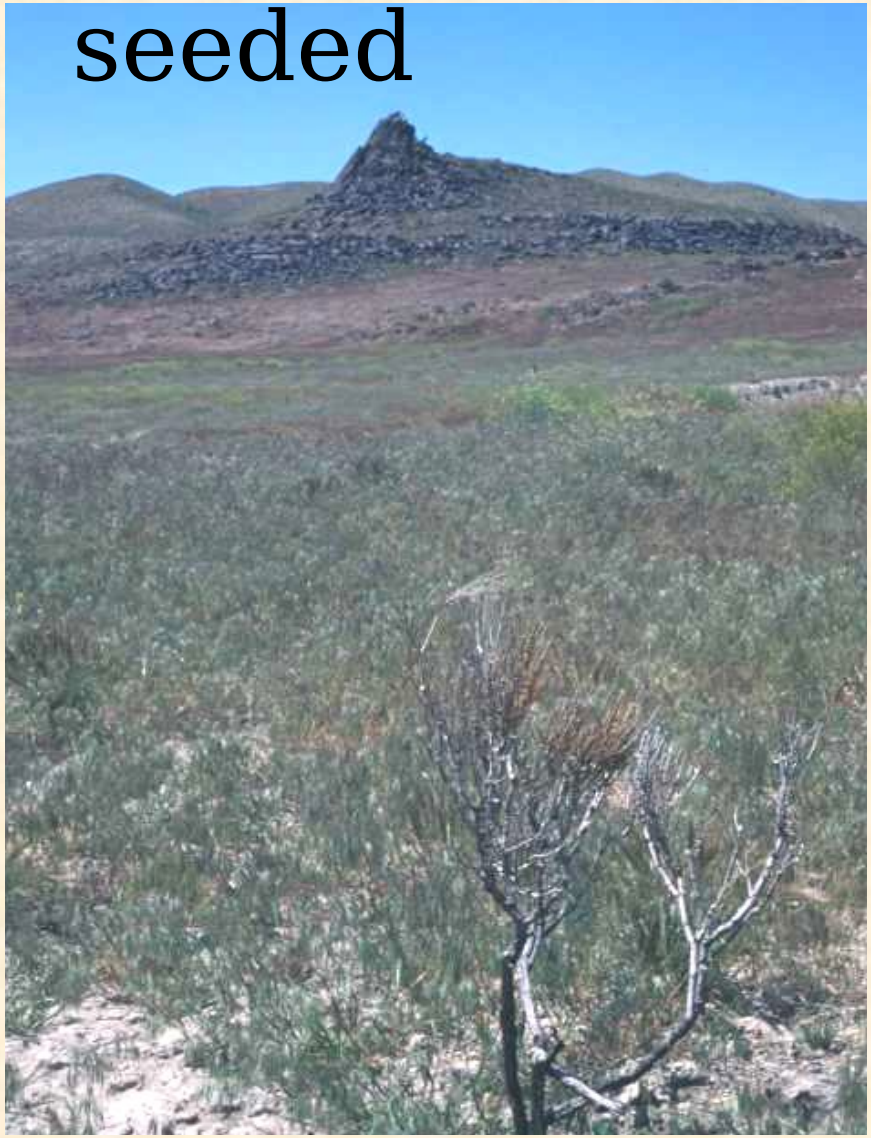
Black Sagebrush Site

Cheatgrass Density/m²



Black Sagebrush Site

Burned Not-seeded



Burned Drill-seeded

Black Sagebrush Site

Conclusions

1. Drill-seeding significantly reduced cheatgrass density in both shrub communities.

2. The data support the hypothesis that drill-seeding perennial species can reduce the density of cheatgrass following fire.

3. Cheatgrass must be controlled in order to maintain optimal conditions for military training

4. Reducing cheatgrass will:
   -minimize fires (promotes a safer training environment)
   -maintain the ecological integrity of training lands
   -promote the growth of shrubs and trees for use

Given both the ecological and training hazards associated with cheatgrass where would you prefer to train?

Questions?

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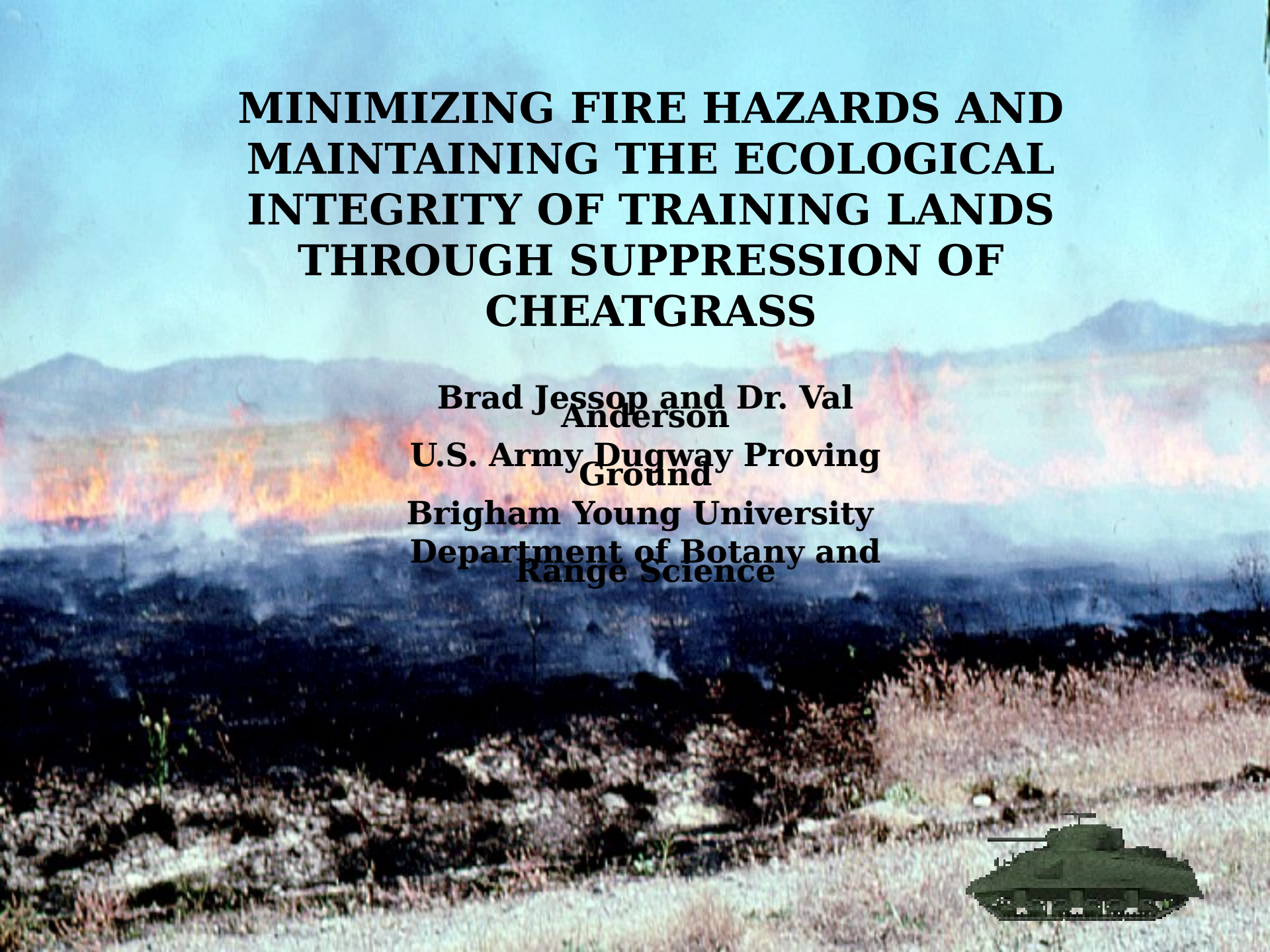
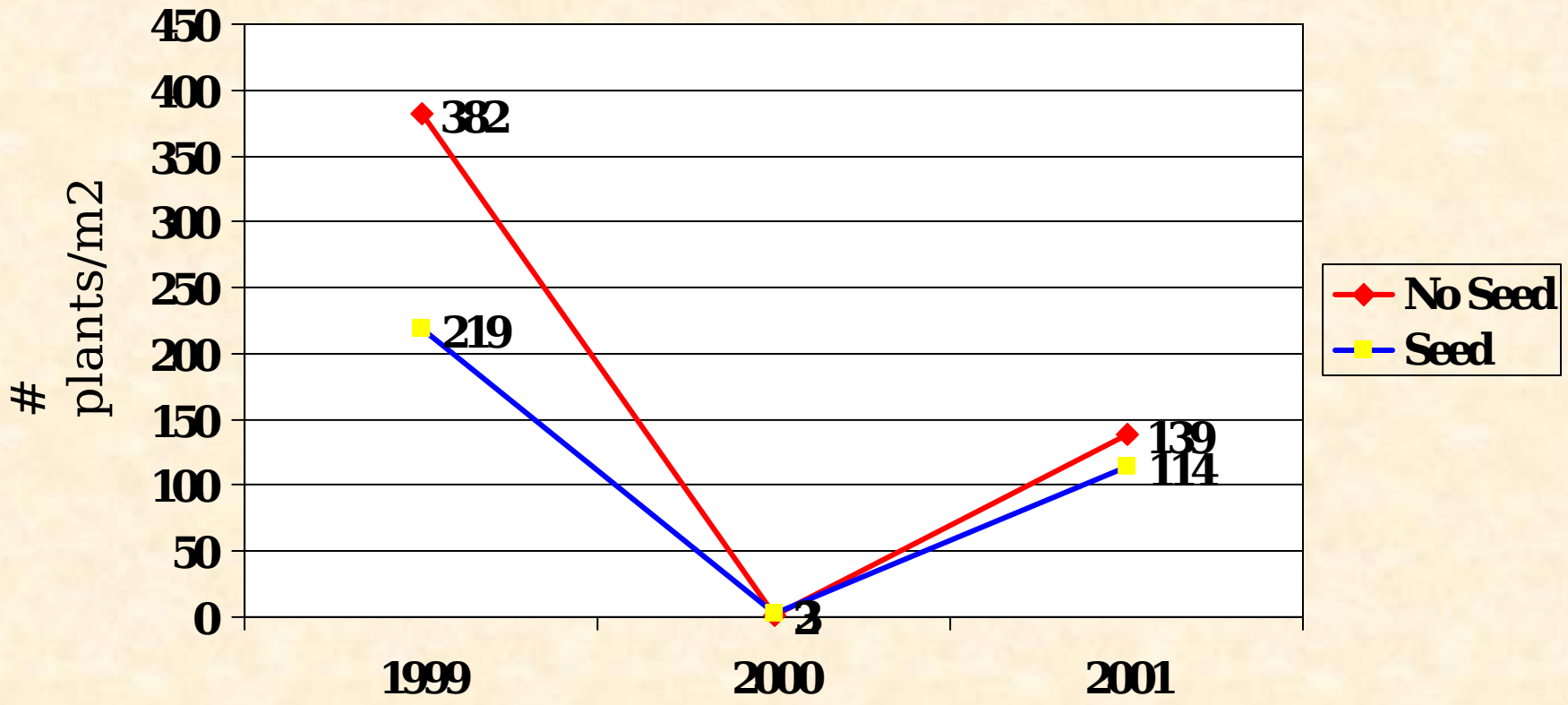
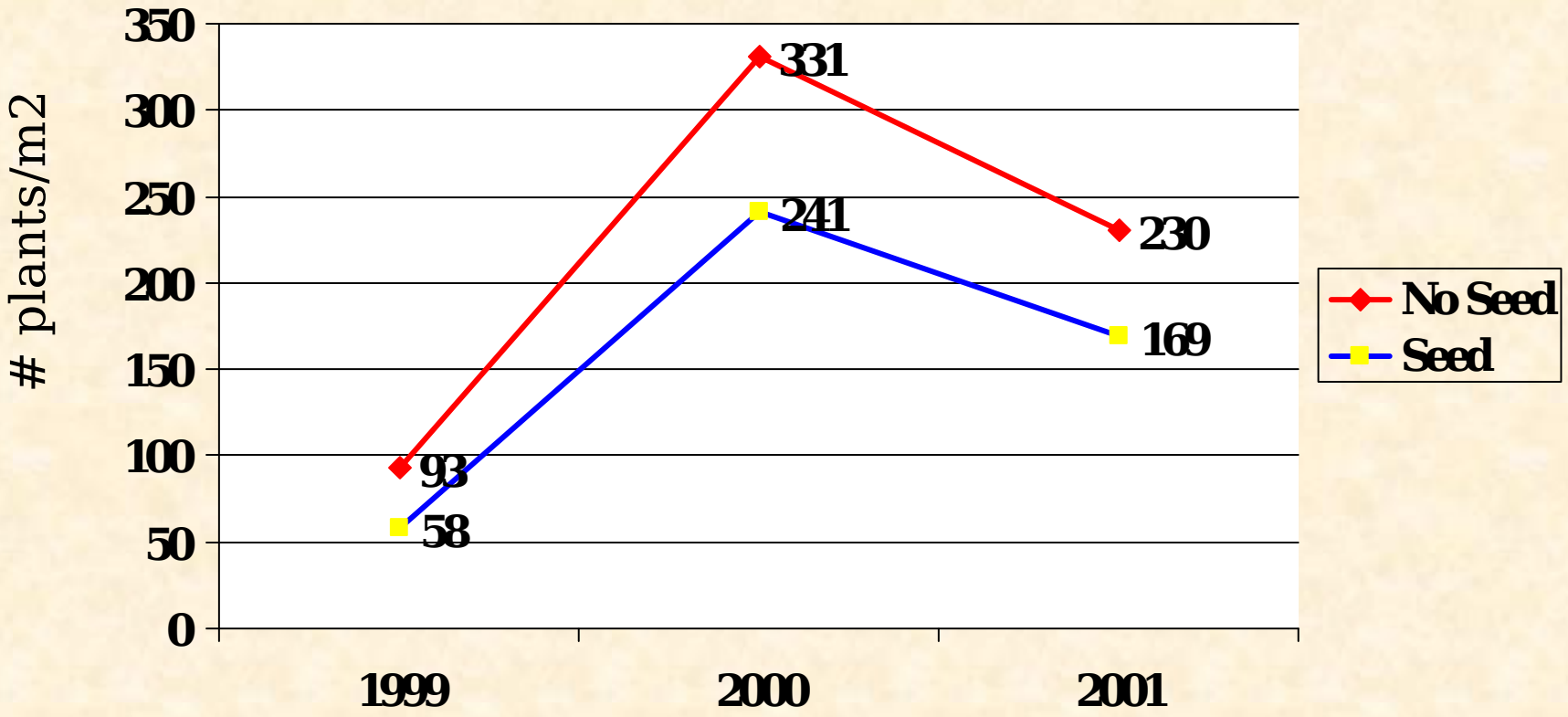
Brigham Young University Department of Botany and Range Science



Cheatgrass Density (Greasewood)



Cheatgrass Density (Black sagebrush)



Non Continuous